

REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested.

Currently, claims 1-3, 6-18 and 21-26 are pending in this application.

Objection to the Drawings:

In the attached replacement sheet of drawings, item 1 illustrated in Fig. 9 has been relabeled as "PABX." Applicant therefore requests that the objection to the drawings be withdrawn.

Objection to the Claims:

Claim 26 was objected to under 37 CFR 1.75(a) because the meaning of the phrase "the speech recognition apparatus" was unclear. By this Amendment, the phrase "the speech recognition apparatus" has been changed to --the pattern recognition apparatus-- in accordance with the Examiner's helpful suggestion. Applicant therefore requests that the objection to claim 26 be withdrawn.

Rejections Under 35 U.S.C. §102 and §103:

Claims 1-3, 6-7, 11-12, 15-18 and 21-24 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Klovstad (U.S. '092). Applicant respectfully traverses this rejection.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Applicant submits that Klovstad fails to disclose each element of the claimed invention. For example, Applicant submits that Klovstad fails to disclose or even suggest "b) applying the data sequence to a set

comprising active models in a network of models including at least one model, wherein each model represents a sub-pattern and comprises a finite state network; c) assessing each state of members of said set and deactivating those states that do not meet a predetermined first criterion, between the application of successive data elements; [and] d) selecting a subset of the outputs of the members of said set according to a predetermined second criterion,” as required by independent claim 1. Independent claims 15 and 16 each requires similar features.

The present invention relates to a method of pattern recognition, such as speech recognition. In an exemplary embodiment of the present invention, features relating to a speech signal are compared to models, each of which represent a word, phoneme or other sub-units of speech, to determine the model that matches closest to the incoming signal. Typically, many models are linked together to form a network with outputs from one model forming inputs to others. Therefore, the number of models that are processed can increase exponentially as paths through the network progress.

Embodiments of the present invention may provide pruning of models in two stages. This “two-tiered” approach is defined in claim 1 in steps c), d) and e). Specifically, step c) recites “assessing each state of members of said set and deactivating those states that do not meet a predetermined first criterion”, which can be viewed as pruning within a model, whereas steps d) and e) recite “selecting a subset of the outputs of the members of said set according to a predetermined second criterion; and adding

further models to said set in dependence on the members of said subset", which can be viewed as pruning the output of a model.

In fact, step e) of claim 1 specifically recites "adding further models" only when a certain criterion has been satisfied. This contrasts with previously known techniques, which are forced to manipulate a large group of models at the same time and delete individual models from the original group. Again, the invention of claim 1 starts with a set of models and adds to that set rather than starting with a set of models and deleting.

These features of claim 1 are supported by, for example, Figure 5 of the present application. In particular, step b) of claim 1 is supported by step S2 and S3 of Figure 5, step c) of claim 1 is supported by step S4 of Figure 5 (see also Figure 7) and steps d) and e) of claim 1 are supported by step S5 of Figure 5 (see also Figure 8).

Claim 1 therefore requires two different predetermined criteria. In particular, claim 1 defines deactivating states within a model in dependence on a predetermined first criterion, and adding further models in dependence on a prior selection of outputs according to a predetermined second criterion.

Klovstad discloses the use of word models, which are linear sequences of acoustic kernels (see col. 15, lines 1-3). Klovstad describes deactivating word models if the minimum score for a word is greater than some predetermined threshold (see col. 16, lines 13-18), and also describes activating kernels of a word (see col. 16, lines 22-25).

The deactivation in Klovstad is thus at the word level and activation is at the kernel level, wherein a word comprises several kernels. Klovstad therefore does not

disclose all of the limitations of claim 1. Even assuming arguendo that the terms in Klovstad of “word” and “kernel” disclose the terms “model” and “state” of the present invention, Klovstad merely teaches deactivating at the model level and activating at the state level. In contrast, claim 1 defines deactivating at a state level, step c), and adding at the model level, steps d) and e), where a model comprises a plurality of states.

Klovstad also fails to disclose “adding further models” in addition to failing to disclose the features in claim 1 relating to models and states described above. Klovstad “activates kernels” rather than “adding words” (models in the present invention). The act of actively “adding” new models rather than “activating” existing models is advantageous as only a limited number of models are handled at any given time.

Accordingly, Applicant submits that claims 1-3, 6-7, 11-12, 15-18 and 21-24 are not anticipated by Klovstad. Applicant therefore respectfully requests that the rejection of these claims under 35 U.S.C. §102 be withdrawn.

Claims 8-10 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Klovstad in view of Tsuji et al (U.S. '057, hereinafter “Tsuji”). Claims 13-14 and 25-26 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Klovstad in view of O'Brien (U.S. '489). Neither Tsuji nor O'Brien remedy the above-described deficiencies of Klovstad. Applicant therefore respectfully requests that the rejections under 35 U.S.C. §103 be withdrawn.

HOVELL et al.
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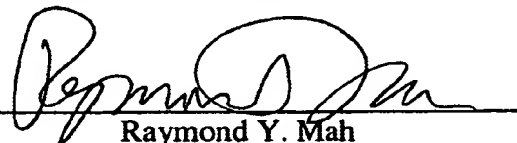
Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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By: _____



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